

“I have also a paper afloat, with a electromagnetic theory of light which, till I am convinced of the contrary, I hold to be great guns.” - James Clerk Maxwell (1864)

1. INTRODUCTION TO PHYS 480:

The form of electrodynamics created by Maxwell in the 19th century is one of the most profoundly influential formulations in physics. It was a turning point in the history of science. For the first time, theoretical work unified distinct disciplines, electricity, magnetism, galvanism (basic circuits) and optics. It led to an understanding of light, gave us both new eyes and new ways of communicating in the form of new technologies (e.g. cell phones). The theory’s form and success were largely responsible for many of the developments in 20th century physics, including special relativity and the search for (elusive) unified theories. So Maxwell was right, the theory is “great guns”. In fact, there are few subjects we could choose to study which are as theoretically satisfying and full of practical application.

It is also a vast subject.

Fortunately we have a master to guide us through the material. Griffiths writes a clear and interesting text. He uses a classical presentation: Mathematical background is presented first, followed by kinematics, dynamics, and applications. We will begin with the Maxwell’s mathematics in modern form.

2. TEXT:

David Griffiths, **Introduction to Electrodynamics** 4th edition.

3. COURSE INFO:

All materials will be available online. You can find them through the Courses tab on my home-page <http://academics.hamilton.edu/physics/smajor/index.html> or physserver. The latest versions will be labeled by a version number in the top right of the first page.

4. GRADES:

There are 3 parts to the grade:

- (1) Problem sets and discussion participation (50 %): Weekly problem sets will be due once a week on Thursday with final revisions due by the end of the day on Friday. Although I encourage you to work together you must write up your own solutions. The assignments will normally be posted and distributed at least one week prior to the due date. Your in-class contributions will be assessed for clarity and novelty.
- (2) Mid-term: (20 %) The exam will be sometime in early November. Details to follow.
- (3) Final (30 %): Our final is scheduled for December 17, 9 -12.

5. WEEKLY SCHEDULE

What follows is preliminary!

Week	Topic	Reading
28 August	Vector Math. Rev.	Ch 1
4 September	Electrostatics	Ch 2
11 September	Math. Tech.	Ch 3
18 September	More Math. Tech.	Ch 3
25 September	Electric fields and matter	Ch 4
2 October	Magnetostatics	Ch 5
9 October	B-fields in matter	Ch 6
16 October	<i>Fall break</i> & Electrodynamics	Ch 6
23 October	Conservation Laws I	Ch 7
30 October	Conservation Laws II	Ch 8
6 November	Exam	on Ch 1-8
13 November	Electromagnetic Waves	Ch 9
20 November	Potentials	Ch 10
27 November	<i>Thanksgiving</i> Radiation	Ch 11
4 December	SR & E&M	Ch 12
17 December	study,study,study...	Final Wednesday 9-12PM

Enjoy!

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